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the presence of *B. coli* in 100 c. c. amounts in the treated water, final bacteriological samples are collected, plated, and prepared in the field, and shipped to the main laboratory, with the routine sampling outfit previously mentioned. These final bacteriological samples serve as a check on the presumptive tests which were made in the field. Whenever necessary, samples are collected for physical and chemical examination.

The plant and equipment described in this article make it possible for a trained worker to enter the field equipped to handle in an emergency the problems met with in treating a polluted water supply. The Minnesota State Board of Health keeps this equipment constantly on hand and in readiness for immediate shipment to any locality requiring such assistance. This work is in charge of the division of sanitation.

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References.

(*a*) Engineering News, vol. 65, No. 14, 1911, p. 402.

(*b*) American Journal of Public Health, vol. 2, No. 12, p. 948.

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(*d*) American Journal of Public Health, vol. 2, No. 12, p. 954.

VENEREAL DISEASE.

ITS PROBABLE PREVALENCE—AN ATTEMPT TO REACH A DEFINITE BASIS OF STATISTICAL VALUE.

By Charles E. Banks, Senior Surgeon, United States Public Health Service.

It must be conceded that the efforts of students of social conditions to estimate the prevalence of venereal disease in any community, State, or nation have been inherently imperfect in results by reason of the absence of any authentic records of definite value. The best that can be said of the estimates is that they are the personal guesses of the men engaged exclusively in venereal work, balancing their impressions into concrete statements of percentages, or that they have been based on the statistics of some municipal dispensary of a large city with its thousands of clients annually by checking off the ratio of venereal cases. Those guesses vary all the way from the extravagant opinion that 80 per cent of the adult male population has been infected, to the more modest suggestion that 20 per cent would cover it.

As there is no present method of getting satisfactory reports of the occurrence of cases of venereal diseases, and as practically every case is concealed by the patient and his physician, if he employs one, or by the druggist who prescribes cures over the counter, it will be seen that only some definite class of persons bearing a known relation to the community at large whose general medical treatment is under special jurisdiction can furnish a fairly proximate evidence of the amount of venereal disease in the body politic. Neither hospitals nor dispensaries of cities can furnish this evidence in a satisfactory way. A near approach to such a class would be the enlisted men of the military services, but they live under peculiar conditions, are selected for physical standards, and bear an abnormal relation to society as a whole. It should be added that they are now under the protection of a scheme of sexual hygiene which has greatly minimized the dissemination of the venereal infection because of the penalties attached for nonobservance of the regulations governing illicit intercourse.

The basis of estimate which I suggest as probably the nearest approach to a normal comparison with the general population is the class known as seamen, or persons engaged in the care and navigation of merchant vessels. To anticipate the objection that the sailor is proverbially a roysterer and not a fair standard of comparison in methods and morals let me say that this is conceded in advance and will be estimated in the results. We can never reduce this question to decimal fractions; it must be by its very quality an indeterminate, not an absolute, factor in social demography. It is well known that the General Government has for 112 years provided a hospital service for the care and treatment of sick and disabled seamen; and as the beneficiaries paid a monthly tax for about 90 years (until 1884) to support these relief stations, it can be fairly said that a vast proportion of eligibles sought its ministrations. In other terms, it was their medical service; they had helped to establish and support it, and they drifted to it whenever sick or disabled when in port. If infected with venereal disease they had no motive for concealment and came at once to the service for treatment.

The next question to consider is that they are all males, a situation which has to be adjusted in any application of statistics. But it can be said that they are of all ages, classes, and conditions of men from 16 to 70 years, and therefore a fairly good representative class to use. They are not picked men physically, just the ordinary run of human kind, although of a somewhat undeveloped type from the social standpoint. The only adjustment necessary is to eliminate from the problem the female element in making comparisons, and thus we shall get, as far as I can see, a logical workable standard. To arrive at the proper conditions we can now make this preliminary proposition: Given the number of males in the United States as shown by decennial censuses and given the number of seafaring men in the United States as shown by the classification of occupations in the census reports, we can determine the relative strength of sailors to the whole male population. This being determined, we may apply the third test, the number of sailors treated in marine hospitals annually for all diseases, which will represent the relative general morbidity in this class. Of this number a certain proportion will be found infected with venereal disease, and the conclusion will follow that out of a known number of seafaring men, at a given year, so many were treated for this specific complaint. Then we can state the last equation and obtain the answer sought: If a certain percentage of seafaring men have venereal disease in 1900, it is reasonable to conclude that the rest of the adult male population in the United States in 1900 will be similarly infected.

The figures on the first of these points may be shown in the following table, giving the total male population for four decennial censuses and the total classed as mariners.

Year.	Boatmen and sailors.	Fishermen, etc.	Total mariners.	Total males in United States.	Per cent of seamen.
1880	88,537	41,352	129,889	25,518,820	0.50
1890	76,874	60,162	137,036	32,237,101	.40
1900	78,406	68,940	147,346	38,816,448	.37
1910	77,715	68,275	145,990	47,332,277	.31
Average	80,383	59,682	140,065	35,976,161	.40

These figures show that the percentage of sailors to males at large has been 0.5, 0.4, 0.37, and 0.31, an average of 0.4 per cent.

The next factor in the problem is to obtain from the marine hospital records of the Public Health Service the total cases treated yearly and the number of venereal cases to the sum total. Fortunately the annual reports for 35 years past give us the results of the observations of trained men selected for their professional skill, and we may be certain that this element of the human equation may be considered as properly established. During that period nearly sixteen hundred thousand cases (1,593,042) have been treated by its officers, an average of about 47,000 annually. In the last 25 years, however, 1886–1910, the work of the service has reached its capacity, and it has been maintained practically at its present figures ever since. These evidences can be sustained for a quarter of a century and will be used for that reason as being more indicative of an actual standing and settled condition.

During that period one and one-third million cases of all kinds have been treated (1,333,600), an average slightly in excess of 50,000 annually. In the tables which follow I have made a division into two general classes—syphilis of the constitutional variety (primary, secondary, and tertiary) and gonorrhea, with its complications of gleet, stricture, epididymitis, etc., all lumped under one head. That is, the table shows syphilis and gonorrhea, comprising all the sequelæ of each. These factors produce the following results:

1886-1910.

All cases treated	1,333,600
Syphilis	111,001
Gonorrhea	174,365
Total venereal	285,366

The percentage of venereal diseases of both kinds to the whole number treated is 21.4. It is to be said that there is some small duplication in these figures. A patient is not a "case"; that is, the individual may be treated at several hospitals for the same "case" during the progress of his disease—say, for example, stricture of the urethra. His case, therefore, becomes recorded occasionally several times. This is more likely to happen in venereal diseases than in other classes, because they are largely ambulatory. Making due allowance for this, it seems to be fair to reduce it to "round numbers" and call it 20 per cent to strike a balance. Now, reverting to our first table, we find that there was an average of 35,976,161 males of all ages in the United States in the period 1880-1910, and an average of 140,065 seafaring men in the United States in the same period. Out of this latter number, 11,414 cases were annually treated in the marine hospitals and their connecting out-offices for venereal diseases of all kinds. This shows, if it is accepted as conclusive, a percentage of 8.15 venereal infections among the entire class of males known as mariners, or seafaring men.

It would not be correct to use the total number of males in the United States as one of the factors in this proportion, as 15 years of age is approximately the minimum at which persons are found in the vocation of seaman, as well as the minimum year when males contract venereal infection, and it will be necessary to subtract a definite number from the total to represent this minority. Compilations from the census returns make it safe to say that 20 per cent of the males are under 15 years of age, and this would leave the total number males of infective age at 28,780,929. The factors are therefore 140,065 seamen in their relation to 28,780,929 males of 15 years and over. If the percentage of annual venereal infection among mariners is 8.15, we can estimate the number of infected males of the adult population throughout the country and say that in the period 1880-1910 there were approximately 2,431,988 cases of venereal disease in each year; that is, cases treated or under treatment.

This does not seem so startling as one might expect, though we have eliminated a half of the population and taken a class for a standard known throughout the ages as an exceptional class. "Jack Tar" is a synonym for a care-free, reckless unit. Indeed, the popular impression is that he is capable of but two human functions, getting drunk and having venereal disease. The statistics of the Public Health Service, as already stated, show that but one case in five among seamen is of venereal origin, and if the professional and popular conception is different from the facts, we may be prepared to admit the now obvious conclusion that the same class of disease is not prevalent among the general public to the extent claimed by some. Indeed, it may be said further that "Jack Tar" is the extreme probability, numerically speaking, of the gonorrheic and syphilitic in our problem. Doubtless he represents high-water mark in the possibilities. Unmarried usually, a rover always, he never dodges a chance for free rum, free fight, or free love. Hence if he shows up but 8 per cent of infection annually it is fair to say that not more than 5 per cent of adult males can be properly under suspicion as original annual venereal victims. Of these males, 2 per cent, in round numbers, would be syphilized and capable of transmitting the constitutional infection to offspring and the remaining 3 per cent could have gonorrhea and its complications. As the number of males in the United States in 1910 was 47,000,000 to 44,000,000 females, it will be seen that the percentage of persons acquiring venereal infection is less than 3 per cent annually. It would be an impossibility to ascertain the number of persons actually infected with venereal disease at any single date without a complete census. The above figures are at best the nearest proximate proportions which can be obtained of the annual intake.

If we were starting fresh to-day, an uninfected Nation, it would take 33 years at the rate of 3 per cent annual infection to syphilize the entire body politic, but each year brings in a new class of the clean humankind and automatically reduces the ratio. The experience of the past is probably not different from the present, and the obvious conclusion as to the percentage of "damaged goods" we have with us, as affected by our remote ancestors, is not obvious at all. It is beyond the practical possibility of determination, because of the existence of so many factorial modifications, such as attenuation, immunity, and accident. The real interest centers practically in facing the problem for the future, not in estimating the exact damages of the past. It is a campaign for prevention, and we can start out by saying that we have to meet with nearly two and a half million cases of venereal diseases annually treated in the United States—about 1 person in every 40.